

Amendments to the Specification:

Please substitute the paragraph beginning on page 15 of the specification and continuing on page 16 with the paragraph provided below. Amendments to the specification are shown with additions underlined and deletions in ~~strikethrough text~~. No new matter is added by this amendment.

The realism of the simulation can be further increased by providing an actuator 135 adapted to provide one or more haptic sensations to the user during the user's interaction with the graphical environment 110. The actuator may either provide the haptic sensation directly to the user or may apply the haptic sensation to the user through the user object, for example by applying a force to the surface of the instrumented glove 161. This allows the user to not only visualize the graphical hand 170 contacting the graphical object 120, but also to receive an indication through the user's sense of touch that the object has been contacted, thereby providing a more immersive experience. The actuator 135 may comprise, for example, a finger forcing mechanism comprising a tip portion adapted to contact a portion of the user's finger. The tip portion may be connected to a tendon which may be pulled by an actuating mechanism to exert a force on the finger. A force-augmenting structure may also be provided to provide more realistic forces to the finger tip. In one particular version, the haptic interface is a CyberGrasp™ device available from Virtual Technologies, Inc. and described in U.S. Patents 5,631,861 and 6,042,555, both of which are incorporated herein by reference in their entireties. The finger forcing mechanism may be worn on the hand and applies computer-controlled force feedback to one or more, preferably each, of the fingers. The haptic interface 140, which includes actuator interface 185, may be advantageously used to simulate the interaction of the graphical hand 170 and a

graphical object 120. An instrumented glove 161 is worn to control the graphical hand 170. The user uses his or her hand to grasp the graphical object 120 with the graphical hand 170. The computer transmits force commands to the actuating mechanisms associated with the finger forcing mechanism so the user may "feel" the graphical object 120 in his or her fingertips. The computer may also transmit force commands to the actuating mechanisms associated with the finger forcing mechanism so the user may also "feel" the graphical object 120 in his or her palm, as disclosed in U.S. Patent application Serial No. 09/837,860 filed on April 17, 201 which is incorporated herein by reference in its entirety. Thus, both precision grasps, which primarily use the finger tips, and power grasps, where an object is held against a user's palm, may be simulated. In another version, the haptic interface may be provided by a CyberTouch™ device available from Virtual Technologies, Inc., and described in U.S. Patent 6,088,017 which is incorporated herein by reference in its entirety. Additionally or alternatively, the haptic interface may comprise a CyberForce™ device available from Virtual Technologies, Inc. and described in U.S. Patents 5,631,861 and 6,042,555 and in U.S. Provisional Patent Application 60/191,047 filed on March 21, 2000, all of which are incorporated herein by reference in their entireties. In this version, the haptic interface 140 comprises a finger forcing mechanism and a grounded force applying member attachable to the user at the wrist, for example, the grounded force applying member may be capable of applying forces in from one to six degrees of freedom and may also be capable of detecting movement in from one to six degrees of freedom.